

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problems Mailbox.**

(12) UK Patent Application (19) GB (11) 2 177 139 A

(43) Application published 14 Jan 1987

(21) Application No 8615614

(22) Date of filing 26 Jun 1986

(30) Priority data

(31) 8516437

(32) 28 Jun 1985

(33) GB

(71) Applicant

Michael Gray Rowan,
Main Castle, East Kilbride, Scotland

(72) Inventor

Michael Gray Rowan

(74) Agent and/or Address for Service

Cruikshank & Fairweather,
19 Royal Exchange Square, Glasgow G1 3AE

(51) INT CL⁴

E04B 7/08

(52) Domestic classification (Edition I):

E1D 112 193 2063 401 402 404 405 414 506 523 DV

RE2

U1S 1708 E1D

(56) Documents cited

GB 1447638

GB 0666495

US 3488899

GB 1310545

US 3762120

(58) Field of search

E1D

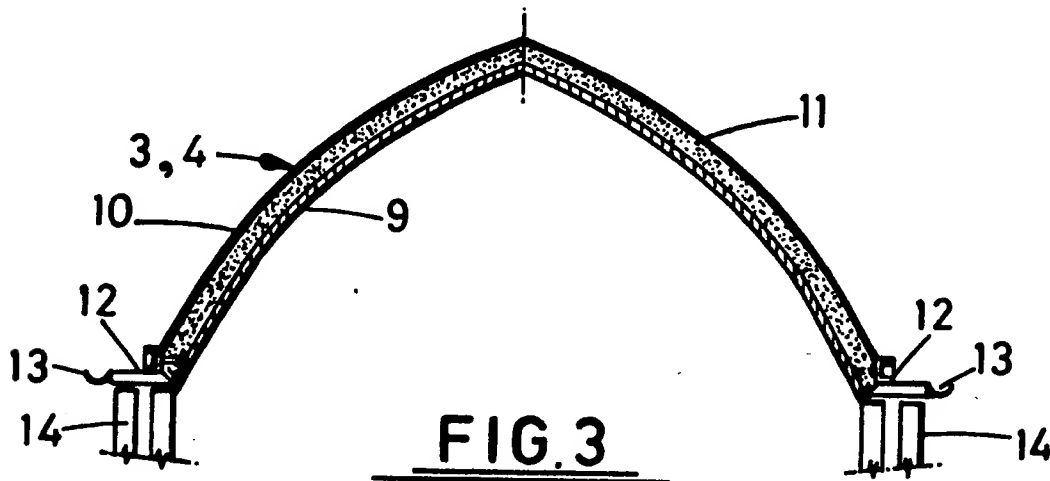
E1A

Selected US specifications from IPC sub-classes E04D

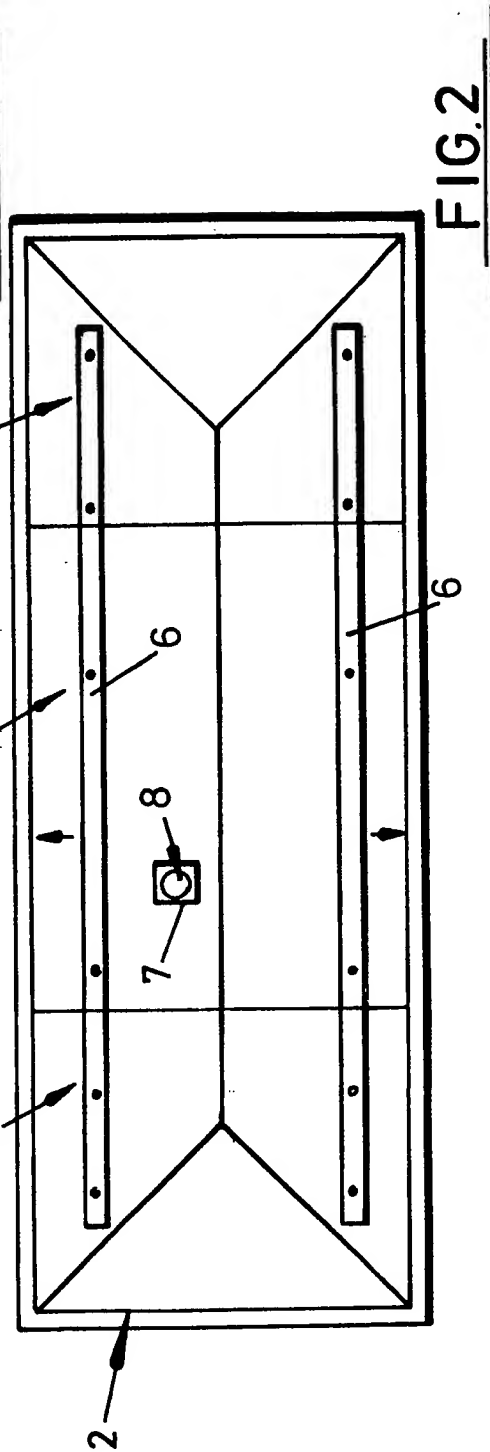
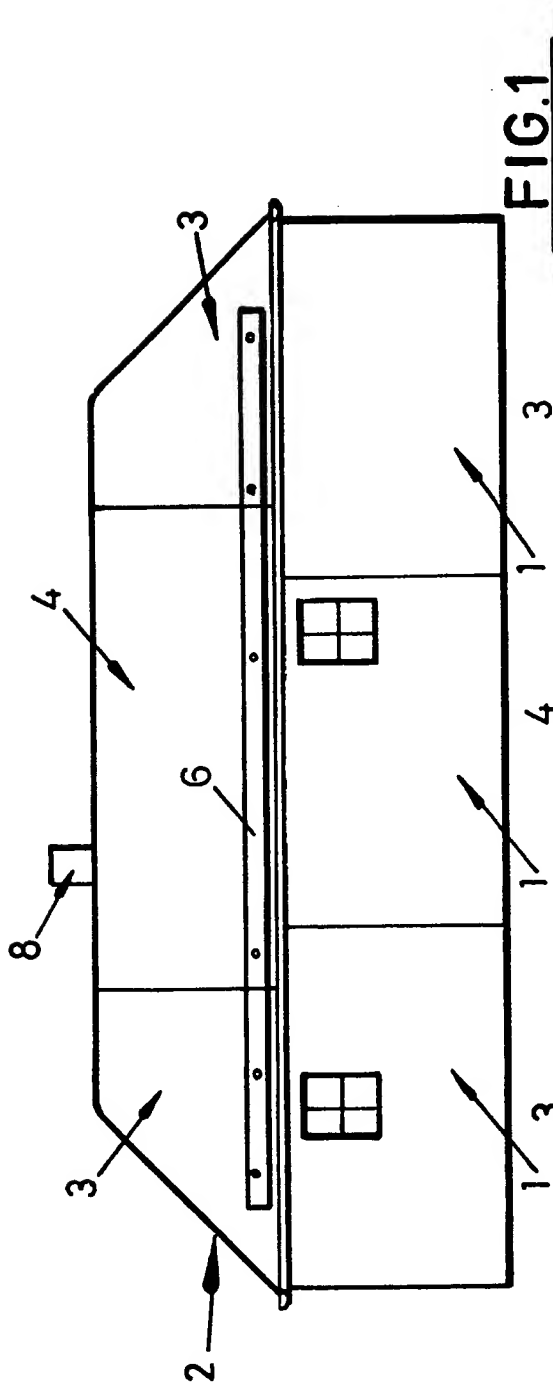
E04B

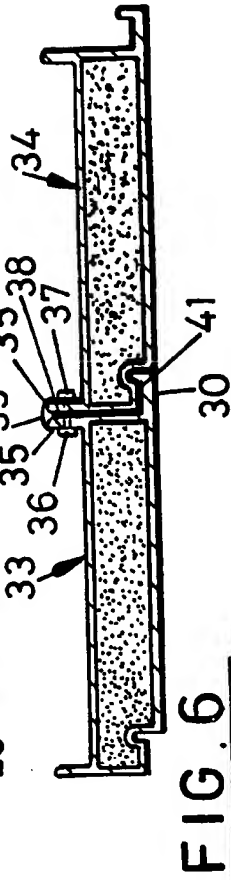
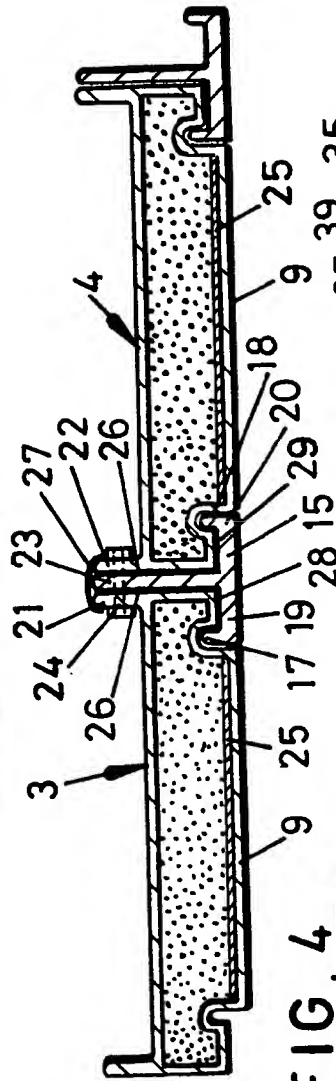
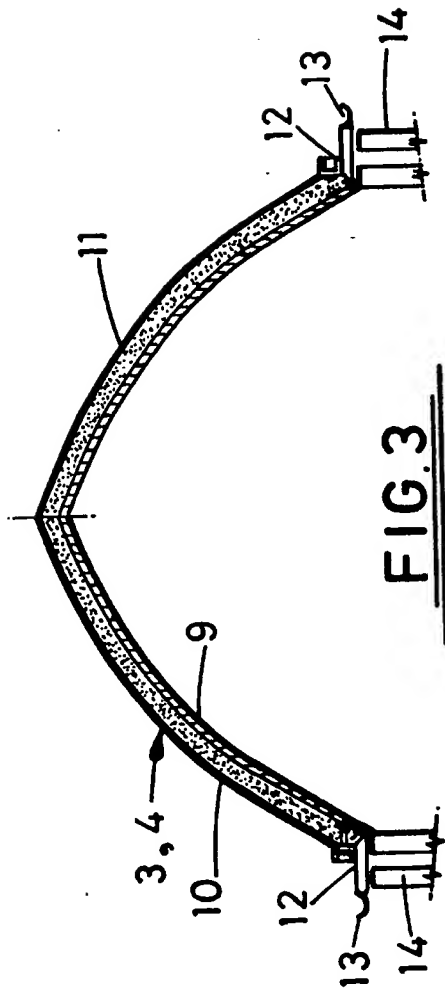
(54) A modular roof

(57) A roof section for use in assembling a modular roof (2) comprising a vaulted roof member having at least two support edges and each edge comprising an integral lintel (12) which in use, is supported on the top of an outside wall of a building. The roof section (3) consists of at least one connecting edge which comprises means (15) for connecting the roof member (3) to the connecting edge of an adjacent roof section (4). In a preferred arrangement the roof section consists of a sandwich of an inner (9) and outer skin (10) between which a layer of insulating material (11) is provided. The inner skin is plywood and glass reinforced plastic and the outer skin consists of a layer of fibre glass which is weather resistant.



GB 2 177 139 A





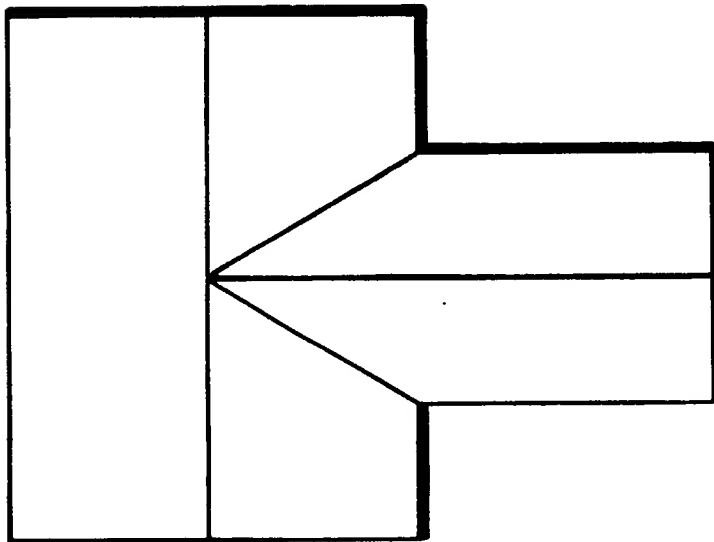


FIG. 5(a)

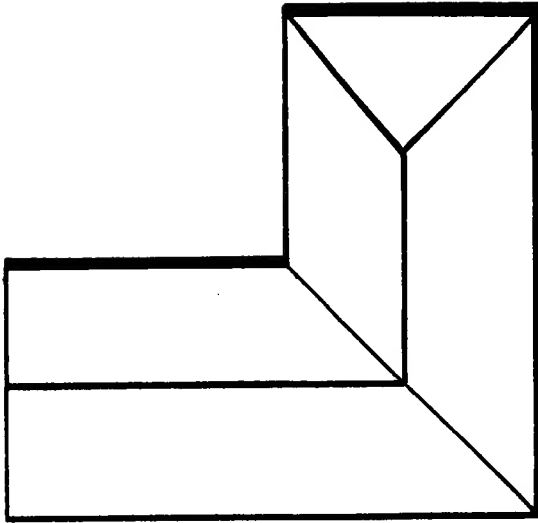


FIG. 5(b)

SPECIFICATION

A modular roof

- 5 The present invention relates to a modular roof and to a roof section for use in assembling a modular roof.

- 10 According to a first aspect of the present invention there is provided a roof section for use in assembling a modular roof comprising a vaulted roof member having at least two support edges, each comprising an integral lintel which in use is supported on top of an outside wall of a building, and at least one connecting edge which comprises means for connecting the roof member to the connecting edge of an adjacent roof section.

- 20 The roof section may be comprised of a sandwich of an inner and outer skin, between which a layer of insulating material is provided. Preferably, the inner skin is comprised of plywood and glass reinforced plastic (GRP) which facilitates internal decorating and the outer skin is comprised of a layer of fibre glass which is weather resistant.

- 25 Alternatively the roof section may comprise a layer of insulating material carried by a support skin. Preferably, the support skin comprises a layer of fibre glass. In addition, laterally running ribs may be formed in the support layer to increase its strength.

In a third embodiment the insulating layer may be dispensed with.

- 35 Preferably, the integral lintel is comprised of reinforced fibre glass.

Preferably, the roof section comprises an integral gutter which runs along each support edge.

- 40 According to a second embodiment of the present invention there is provided a modular roof assembled from roof sections according to the first aspect of the present invention.

- Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 shows a front view of a rendered cottage having a modular roof comprised of roof section embodying the present invention;

- 50 Fig. 2 shows a plan view of the rendered cottage of Fig. 1;

Fig. 3 shows a lateral cross-section through a roof section embodying the present invention;

- 55 Fig. 4 shows a longitudinal cross-section through two connected roof sections at the apex of the roof embodying the present invention;

- 60 Figs. 5(a) and (b) show plan views of various roof sections roof embodying the present invention, and

Fig. 6 illustrates an alternative longitudinal cross-section similar to Fig. 4.

- 65 Referring to Figs. 1 and 2 of the accompanying drawings there is shown a simple cot-

tage structure comprised of three in-line rooms 1. The roof 2 is comprised of a plurality of modular roof sections, and more specifically two end sections 3 and a middle section 4. Being of unitary construction each roof section 3, 4 can be lifted up onto the walls 5 of the cottage, where it can be secured to its immediate neighbour/s and to the walls 5 of the cottage, as will be explained in detail hereinafter. As such assembly of the roof 2 is both quick and simple, which is ideal from the point of view of the do-it-yourself enthusiast, and from that of the contractor, who does not need to bring in expensive skilled labour. Each end section 3 is of a boxed construction, which provides storage space in the roof where, for example, the water tank and water cistern may be tidily hidden from view. Being of boxed construction the end sections 4 are not susceptible to lateral spreading and this fact is taken advantage of to eliminate the need for cross ties between the sides of the middle section 4. In this respect, longitudinal bracing members 6 of U-shaped section steel are secured along the outside edge of the roof 2 between the two end sections 3 to prevent the sides of the middle section 4 from spreading. In the middle section 4 an aperture 7 is provided through which the chimney stack 8 can extend.

- 70 Referring now to Fig. 3 of the accompanying drawings it will be seen that each roof section 3, 4 is fabricated from an inner skin 9 and an outer skin 10, between which is sandwiched a layer of insulating material 11. The inner skin 9 is comprised of plywood, which provides an ideal surface for decorating on. The outer skin 10 is comprised of glass fibre, which provides a strong weather proof finish to the roof section 3, 4. Along each side of the roof section the fibre glass outer skin 10 is reinforced to provide an integral lintel 12. The integral lintel 12 rests on the upper edge of the house walls. Beyond the edge of the integral lintel 12 a gutter section 13 is provided. This too may be formed from the fibre glass outer skin 10 making it an integral feature of the roof section 3, 4 or it may be secured to the integral lintel 12 after the roof section has been fabricated. Roof ties 14 are secured along the bottom edge of the lintel 12 and these are secured to the walls of the cottage by means of screws or masonry nails to hold the roof section 3, 4 in place. Once secured the roof ties 14 can be concealed using rendering.

- 75 Referring to Fig. 4 of the accompanying drawings, each roof section 3, 4 comprises an abutment edge which is coupled to an adjacent section via a plywood and fibre glass invented T-piece 15. Each roof section 3, 4 has a recess 17, 18 into which arms 19, 20 of the T-piece fit. The roof sections 3, 4 have upstanding lips 21, 22 which can be secured to the leg 23 of the invented T-piece 15 via

nut and bolt 24. Each roof section 3, 4 has two recesses and two upstanding lips. Each roof section has a plywood inner skin 9 which has an inner GRP skin 25 which acts as a vapour barrier. To ensure that the join is watertight a gasket 26 is positioned between the two facing lips 21, 22 and these are then covered with water proof tape 27. The inward faces of the arms 19, 20 mate with the recess and this mating of projections and recesses ensures that, together with bolt 24, adjacent sections are securley held together and define channels 28, 29 which acts as gutters to minimise the likelihood of water reaching the inside of the roof.

Referring to Figs. 5(a) and (b) there are shown, respectively, plan view of a T-shaped middle section, and an L-shaped end section. Using these further roof sections in combination with the middle and end sections shown in Figs. 1 and 2 it is possible to construct a roof for almost any shape and length of house, provided the width of the sections is correctly determined.

An alternative arrangement of roof sections is seen in Fig. 6 of the accompanying drawings in which each roof section 33, 34 comprises an abutment edge which facilitates its connection to its immediate neighbour. Each abutment edge comprises a lip 35 which extends from the outward side of the roof section 33, 34 through which holes are provided. Through these holes a bolt 36 can be passed and secured by a nut 37 to hold the sections 33, 34 together. To ensure that the join between adjacent roof sections 33, 35 is watertight a watertight gasket 38 is positioned between the two facing edges of the roof sections 33, 34 and the lips 35 are covered over with weatherproof sealing tape 39. The inward side of roof section 33 is provided with an L-shaped projection 40 which mates with the adjacent edge of the inward side of the neighbouring roof section 34. This mating projection ensures that the two sections 33, 34 are securely held together and further reduces the chance of water reaching the inside of the roof by providing a self-gutter 41.

Being of modular construction the roof assembly embodying the present invention can be constructed quickly and with the absolute minimum of skilled labour. Being comprised of a sandwich of insulating material it is not necessary to take up valuable roof spaced with an insulating layer, which is a very significant advantage particularly with the old, low, single storage cottages one finds in a lot of rural areas. Once the roof is assembled it is essentially of unitary construction and it is a relatively simple matter to cover it with a natural finish, such as turf, thatch or slate although where glass fibre is used for the outer skin it is equally simple to contour and colour the glass fibre to give the appearance of a natural finish.

Of course, where the distance between the end sections is very great or the rooms are not arranged in a simple in-line configuration the middle sections may need to be provided with cross ties, but in any event both the size of these and the number which need to be provided can be reduced using the box shaped end sections and the longitudinal bracing members.

Finally, whilst the roof sections have been referred to as being essentially comprised of a sandwich of plywood, insulating material and glass fibre, it will be appreciated that other constructions are envisaged within the scope of the present invention. For example, inner and outer skins of the roof sections may be comprised of metal or plastics materials or a plastic/metal or plastic/wood composite.

CLAIMS

1. A roof section for use in assembling a modular roof comprising a vaulted roof member having at least two support edges, each comprising an integral lintel which in use is supported on top of an outside wall of a building, and at least one connecting edge which comprises means for connecting the roof member to the connecting edge of an adjacent roof section.
2. A roof section as claimed in claim 1 wherein the roof section may be comprised of a sandwich of an inner and outer skin, between which a layer of insulating material is provided.
3. A roof section as claimed in claim 1 or claim 2 wherein the inner skin is comprised of plywood and glass reinforced plastic (GRP) which facilitates internal decorating.
4. A roof section as claimed in any preceding claim wherein the outer skin is comprised of a layer of fibre glass which is weather resistant.
5. A roof section as claimed in claim 1 wherein the roof section comprises a layer of insulating material carried by a support skin.
6. A roof section as claimed in claim 5 wherein the support skin comprises a layer of fibre glass.
7. A roof section as claimed in claim 5 or claim 6 wherein laterally running ribs are formed in the support layer to increase its strength.
8. A roof section as claimed in any preceding claim wherein the integral lintel consists of reinforced fibre glass.
9. A roof section as claimed in any preceding claim wherein each roof section has a projection and a recess for engaging in a complementary recess and projection of an adjacent roof section, and the projection defining on a surface an integral gutter running along each support edge.
10. A roof section as claimed in any one of claims 1 to 8 wherein each roof section has two recesses for receiving complementary

projections of an invented T-coupling for fastening adjacent roof sections together, the projections of the invented coupling having at least one surface defining gutter running along the edge of each roof section.

5 11. A modular roof consisting of a plurality of roof sections as claimed in any preceding claim.

12. A roof section substantially as hereinbefore described with reference to Figs. 1 to 5 of the accompanying drawings.

13. A roof section substantially as hereinbefore described with reference to Figs. 1 to 3, 5 and 6 of the accompanying drawings.

15 14. A modular roof substantially as hereinbefore described with reference to Figs. 1 to 5 or to Figs. 1 to 3, 5 and 6 of the accompanying drawings.

Printed in the United Kingdom for
Her Majesty's Stationery Office, Dd 8818935, 1987, 4235.
Published at The Patent Office, 25 Southampton Buildings,
London, WC2A 1AY, from which copies may be obtained.